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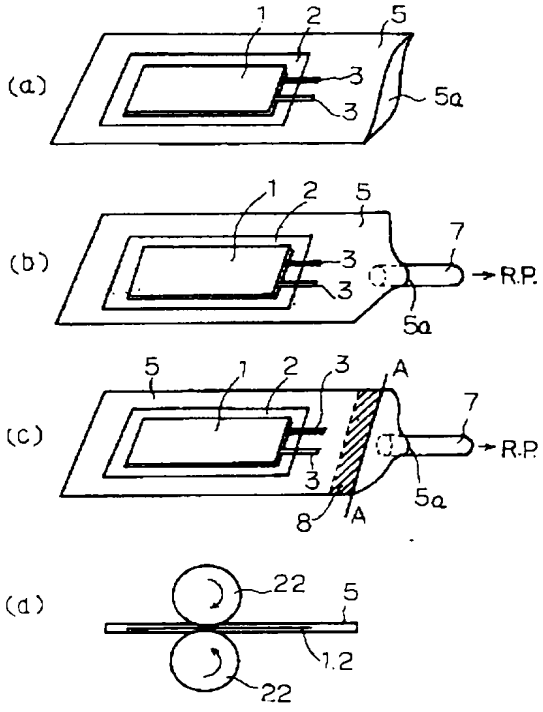
(54)【発明の名称】　電界発光灯の製造方法

(57)【要約】

【目的】　電界発光素子と外皮フィルムとの間に気泡が含まれないようにして、小型化が図れる電界発光灯の製造方法を提供する。

【構成】　まず、２枚の外皮フィルム２とその間に挟んだ電界発光素子１を袋５内に真空パックする。次に、この袋５に入れた状態で、電界発光素子１を外皮フィルム２の間に封止するために、一対の熱ロール２２の間を通して、外皮フィルムの外周部を熱圧着する。電界発光素子１を外皮フィルム２に封止後、真空パックしていた袋５から取り出す。



【特許請求の範囲】

【請求項１】電界発光素子を挟持した外皮フィルムを袋に収納する工程と、該袋を真空に排気する工程と、袋を気密に仮封止して前記電界発光素子を真空パックする工程と、該真空パックした袋ごと熱圧着する工程とを具備することを特徴とする電界発光灯の製造方法。

【請求項２】電界発光素子を挟持した外皮フィルムを袋に収納する工程と、該袋を真空に排気しながら熱圧着する工程とを具備することを特徴とする電界発光灯の製造方法。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】本発明は電界発光灯の製造方法に関し、特に、扁平な電界発光素子と外皮フィルムとの間に気泡を含まない小型化が図れる電界発光灯の製造方法に関する。

【０００２】

【従来の技術】電界発光灯は、文字や図形等の静止ディスプレイや液晶ディスプレイパネルのバックライト等に利用されるもので、その構造を図３を参照して説明する。

【０００３】電界発光灯１０は、扁平な矩形の電界発光素子１の表裏を吸湿フィルムを介して２枚の外皮フィルム２，２でサンドイッチ式に挟んで封止したものである。電界発光素子１は、裏面側から表面側へ、アルミ箔からなる背面電極、反射絶縁層、蛍光体を含む発光層、透明電極を積層したもので、上記背面電極と透明電極の一辺から２本の電極引出し用のリード３，３が導出されている。外皮フィルム２，２の外周部２ａ，２ａを熱圧着して電界発光素子１を封止する。

【０００４】このような電界発光灯１０は、図４に示すような装置により製造される。この装置は、長尺な帯状外皮フィルム２０，２０を巻装した一対のロール２１，２１と２本の帯状外皮フィルム２０，２０を熱圧着する一対の熱ロール２２，２２とを具備したものである。

【０００５】２本の帯状外皮フィルム２０，２０間に電界発光素子１が供給されて、帯状外皮フィルム２０，２０が熱ロール２２，２２によって熱圧着されると、帯状外皮フィルム２０，２０内に電界発光素子が封止される。そして、それぞれに切断することにより、電界発光灯１０が完成する。

【０００６】

【発明が解決しようとする課題】従来の電界発光灯の製造方法では、図５に示すように電界発光素子１と外皮フィルム２との間に気泡４が生じる。この気泡４は、電界発光素子１の周縁部に目立って発生し、外皮フィルム２の封止性能の劣化等を引き起こすという不具合を生じる。現状では、気泡１が生じても封止性能が低下しないように、外皮フィルム２の熱圧着部分である封止部２ａの幅Ｗを拡大することにより、電界発光素子の封止性を確保している。しかし、外皮フィルム２の封止部２ａは非発光部であるから、製品を小型化するためには、外皮フィルム２の封止部２ａの幅Ｗを拡大することは好ましくない。

【０００７】そこで、本発明は電界発光素子１と外皮フィルム２との間に気泡が生じないようにして、その分上記外周部の幅を縮小し、小型化を図った電界発光灯の製造方法を提供することを目的とする。

【０００８】

【課題を解決するための手段】上記目的を達成するための手段は、電界発光素子を挟持した外皮フィルムを袋に収納する工程と、該袋を真空に排気する工程と、袋を気密に仮封止して前記電界発光素子を真空パックする工程と、該真空パックした袋ごと熱圧着する工程とを具備することを特徴とする。

【０００９】また、電界発光素子を挟持した外皮フィルムを袋に収納する工程と、該袋を排気しながら熱圧着する工程とを具備することを特徴とする。

【００１０】

【作用】真空雰囲気中で外皮フィルムの外周部を熱圧着するので、外皮フィルムと電界発光素子との間に気泡を含まず、このため封止幅を小さくできて小型化した電界発光灯を得ることができる。また、電界発光素子を挟持した外皮フィルムを袋に収納し、真空に排気し、袋ごと熱圧着するので、製造装置が簡便であり製造コストが低減する。また、袋に収納したまま保管することができて、電界発光灯の劣化を防止することができる。

【００１１】

【実施例１】本発明に係る電界発光灯の製造方法を図１乃至図２を参照して説明する。

【００１２】但し、従来と同一相当部分は同一符号を付して、その説明を省略する。

【００１３】まず、図１（ａ）に示したように、電界発光素子を外皮フィルム２の間に入れて、サンドイッチ式に挟み込んだ状態のものを、一辺に開口部５ａを有する袋５の中に入れる。袋５は、例えば、ビニール，ポリエチレンなど、真空が簡単に破れず、柔軟性を有し、熱圧着の際に熱が効率よく伝導する材料が望ましい。

【００１４】次に、図１（ｂ）に示すように、袋５の開口部５ａにロータリーポンプ（Ｒ．Ｐ．）などの真空装置（図示せず）の排気管７を取り付けて排気し、袋５内を真空状態にする。次に図１（ｃ）に示したように、袋５の開口部５ａ側を熱圧着して仮封止し（８は仮封止部）、外皮フィルム２，２とその間に挟んだ電界発光素子１を袋５内に真空パックする。次に、仮封止部８の外端をＡ－Ａ線に沿って袋を切断する。

【００１５】次に、図１（ｄ）に示すように袋５に入れた状態で、電界発光素子１を外皮フィルム２，２間に封止するために、袋ごと一対の熱ロール２２，２２の間に通して、外皮フィルム２，２の外周部を熱圧着する。

【００１６】電界発光素子１を外皮フィルム２，２間に封止後、真空パックしていた袋５から取り出すことにより、気泡４を含まず、かつ，外皮フィルム２の外周部２ａを必要最小限とした小型の電界発光灯を完成することが出来る。

【００１７】

【実施例２】本発明の第２の実施例について説明する。

【００１８】これは図２に示したように袋を仮封止せず、袋５の開口部５ａから真空引きしながら熱圧着するもので、一対のロール２３，２３で空気を押出ながら排気するので、袋５内の真空度が向上し、気泡４の除去がさらに確実になる。

【００１９】

【発明の効果】電界発光素子と外皮フィルムとの間に気泡を含まないために、外皮フィルムの封止性能を確保したまま、封止部の幅を減少できるために、電界発光灯の小型化を図ることができる。

【００２０】熱圧着ロールを真空チャンバ内に保持することなく、簡易に電界発光灯を真空封止することができる。

【図面の簡単な説明】

【図１】　本発明の第１の実施例の電界発光灯の製造方法を説明するための概略図。

（ａ）は、外皮フィルムに挟持された電界発光素子を袋に収納する工程を示す

（ｂ）は、袋を真空に排気する工程を示す

（ｃ）は、排気後、袋を仮封止して真空パックする工程を示す

（ｄ）は、ｃの袋を熱圧着する工程を示す

図２】　本発明の第２の実施例の電界発光灯の製造方法を説明するための概略図。

【図３】　従来の電界発光灯の一部切欠き斜視図。

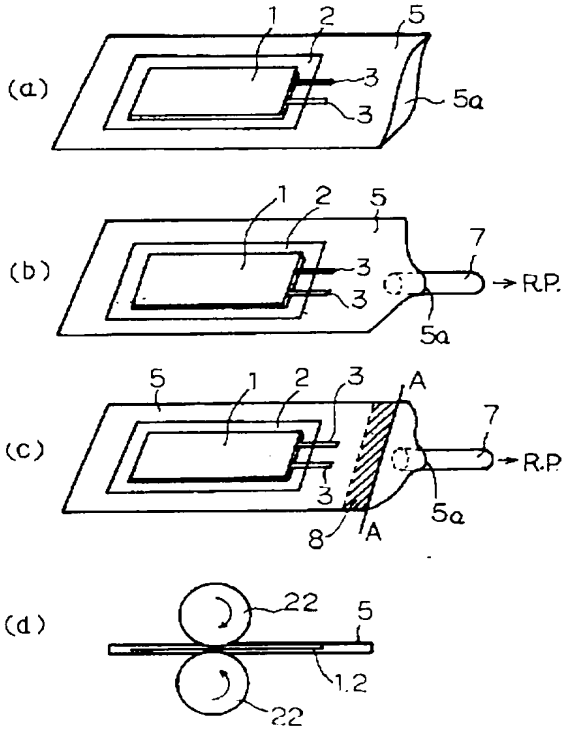
【図４】　従来の電界発光灯の製造装置の概略図。

【図５】　従来の電界発光灯の課題を説明するための横断面図。

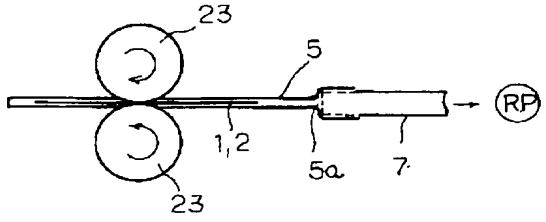
【符号の説明】

１　電界発光素子
２　外皮フィルム
２ａ　封止部
３　取り出し電極
４　気泡
５　袋
５ａ　開口部
７　排気管
８　仮封止部
２０　帯状外皮フィルム
２１，２３　ロール
２２　熱ロール

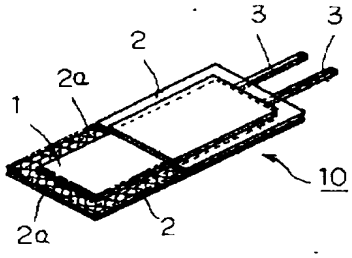
【図１】



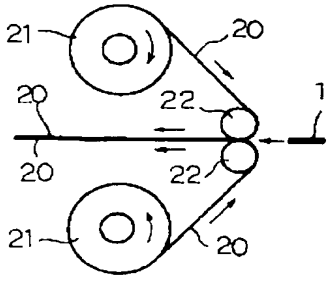
【図２】



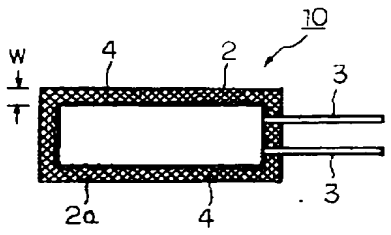
【図３】



【図４】



【図５】



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(54) [Title] **MANUFACTURE OF ELECTROLUMINESCENCE LAMP**

(57) [Abstract]
[PURPOSE] To provide an electroluminescence lamp manufacturing method by which downsizing can be realized by preventing bubbles from being contained between an electroluminescence element and skin films.
[CONSTITUTION] In the first place, two skin films 2 and an electroluminescence element 1 sandwiched between them are packed in a bag 5 under vacuum. Next, in order to seal electroluminescence element 1 between the skin films 2 in a condition of being put in this bag 5, the element is passed between a pair of hot rolls 22, and the outer peripheral parts of the skin films are press- fitted thermally. After the electroluminescence element 1 is sealed between the skin films 2, it is taken out from the vacuum-packing bag 5.

[Claim(s)]

[Claim 1] The manufacture technique of the electroluminescence LGT characterized by providing the process which contains into a bag the envelope film which pinched electroluminescence devices, the process which exhausts this bag to a vacuum, the process which carries out temporary closure of the bag airtightly, and carries out the vacuum packing of the aforementioned electroluminescence devices, and the process which carries out thermocompression bonding every bag which carried out this vacuum packing.

[Claim 2] The manufacture technique of the electroluminescence LGT characterized by providing the process which contains into a bag the envelope film which pinched electroluminescence devices, and the process which carries out thermocompression bonding while exhausting this bag to a vacuum.

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the manufacture technique of an electroluminescence LGT that the miniaturization which does not contain the foam between flat electroluminescence devices and an envelope film especially can be attained, about the manufacture technique of an electroluminescence LGT.

[0002]

[Description of the Prior Art] An electroluminescence LGT is used for quiescence displays, such as a character and a graphic, the backlight of a liquid crystal display panel, etc., and explains the structure with reference to drawing 3.

[0003] Electroluminescence LGT 10 minds the moisture absorption film, and with the envelope films 2 and 2 of two sheets, a sandwiches formula pinches the front reverse of the electroluminescence devices 1 of a flat rectangle, and it closes it. Electroluminescence devices 1 are what carried out the laminating of the back plate which consists of aluminum foil, a reflective insulating layer, the luminous layer containing a fluorescent substance, and the transparent electrode from the rear-face side to the front-face side, and the leads 3 and 3 for electrode cash drawers of two are drawn from one side of the above-mentioned back plate and a transparent electrode. Thermocompression bonding of the periphery sections 2a and 2a of the envelope films 2 and 2 is carried out, and electroluminescence devices 1 are closed.

[0004] Such electroluminescence LGT 10 is manufactured by the equipment which is shown in drawing 4. This equipment possesses the hot calender rolls 22 and 22 of the couple which carries out thermocompression bonding of the rolls 21 and 21 of a couple and two band-like envelope films 20 and 20 which looped around the long picture band-like envelope films 20 and 20.

[0005] If electroluminescence devices 1 are supplied between two band-like envelope

films 20 and 20 and thermocompression bonding of the band-like envelope films 20 and 20 is carried out by hot calender rolls 22 and 22, electroluminescence devices will be closed in the band-like envelope film 20 and 20. And electroluminescence LGT 10 is completed by cutting to each.

[0006]

[Problem(s) to be Solved by the Invention] By the manufacture technique of the conventional electroluminescence LGT, as shown in drawing 5, the foam 4 arises between electroluminescence devices 1 and the envelope film 2. Among the periphery section of electroluminescence devices 1, this foam 4 is conspicuous, and is generated, and the fault of causing a degradation of the closure performance of the envelope film 2 etc. is produced. In the present condition, the closure nature of electroluminescence devices is secured by expanding width-of-face W of closure section 2a which is the thermocompression bonding fraction of the envelope film 2 so that a closure performance may not fall, even if the foam 4 arises. However, since closure section 2a of the envelope film 2 is the section non-emitting light, in order to miniaturize a product, it is not desirable to expand width-of-face W of closure section 2a of the envelope film 2.

[0007] Then, as the foam does not produce this invention between electroluminescence devices 1 and the envelope film 2, the width of face of the part above-mentioned periphery section is reduced, and it aims at offering the manufacture technique of an electroluminescence LGT of having attained the miniaturization.

[0008]

[Means for Solving the Problem] The means for attaining the above-mentioned purpose is characterized by providing the process which contains into a bag the envelope film which pinched electroluminescence devices, the process which exhausts this bag to a vacuum, the process which carries out temporary closure of the bag airtightly, and carries out the vacuum packing of the aforementioned electroluminescence devices, and the process which carries out thermocompression bonding every bag which carried out this vacuum packing.

[0009] Moreover, it is characterized by providing the process which contains into a bag the envelope film which pinched electroluminescence devices, and the process which carries out thermocompression bonding while exhausting this bag.

[0010]

[Function] Since thermocompression bonding of the periphery section of an envelope film is carried out in the vacuum ambient atmosphere, the electroluminescence LGT which closure width of face could be made small for this reason, and was miniaturized between an envelope film and electroluminescence devices excluding the foam can be obtained. Moreover, since the envelope film which pinched electroluminescence devices is contained into a bag, it exhausts to a vacuum and thermocompression bonding is

carried out every bag, the manufacturing installation is simple and a manufacturing cost decreases. Moreover, it can be saved, contained into a bag and a degradation of an electroluminescence LGT can be prevented.

[0011]

[Example 1] The manufacture technique of the electroluminescence LGT concerning this invention is explained with reference to the drawing 1 or the drawing 2.

[0012] However, the former and an identity equivalent fraction attach the same sign, and omit the explanation.

[0013] First, as shown in drawing 1 (a), electroluminescence devices are put in between the envelope films 2, and the thing of the status that it put between the sandwiches formula is put in into the bag 5 which has opening 5a in one side. A bag 5 has the desirable materials which a vacuum is not torn simply, but have flexibility and heat conducts efficiently in the case of thermocompression bonding, such as vinyl and polyethylene.

[0014] Next, as shown in drawing 1 (b), the exhaust pipe 7 of vacuum devicess (not shown), such as a rotary pump (R. P.), is attached and exhausted to opening 5a of a bag 5, and the inside of a bag 5 is made into a vacua. Next, as shown in drawing 1 (c), thermocompression bonding of the opening 5a side of a bag 5 is carried out, temporary closure is carried out (8 is the temporary closure section), and the vacuum packing of the electroluminescence devices 1 inserted the envelope films 2 and 2 and between them is carried out into a bag 5. Next, along with an A-A line, a bag is cut for the outer edge of the temporary closure section 8.

[0015] Next, in order to close electroluminescence devices 1 between the envelope film 2 and 2 in the status that it put into the bag 5 as shown in drawing 1 (d), it lets it pass among the hot calender rolls 22 and 22 of a couple every bag, and thermocompression bonding of the periphery section of the envelope films 2 and 2 is carried out.

[0016] The small electroluminescence LGT which made necessary minimum periphery section 2a of the envelope film 2 can be completed by taking out electroluminescence devices 1 from the bag 5 which was carrying out the vacuum packing after closing between the envelope film 2 and 2, excluding the foam 4.

[0017]

[Example 2] The 2nd example of this invention is explained.

[0018] Since thermocompression bonding is carried out and air is exhausted with extrusion with the rolls 23 and 23 of a couple, carrying out. (this does not carry out temporary closure of the bag, as shown in drawing 2, but) vacuum length from opening 5a of a bag 5, the degree of vacuum in a bag 5 improves, and elimination of the foam 4 becomes still certain.

[0019]

[Effect of the Invention] Since the width of face of the closure section can be decreased,

securing the closure performance of an envelope film since the foam is not included between electroluminescence devices and an envelope film, a miniaturization of an electroluminescence LGT can be attained.

[0020] Vacuum closure of the electroluminescence LGT can be carried out simply, without holding a thermocompression-bonding roll in a vacuum chamber.

[Brief Description of the Drawings]

[Drawing 1] The schematic diagram for explaining the manufacture technique of the electroluminescence LGT of the 1st example of this invention.

(a) shows the process which contains into a bag the electroluminescence devices pinched by the envelope film.

(b) shows the process which exhausts a bag to a vacuum.

(c) shows the process which carries out temporary closure of the bag and carries out a vacuum packing after exhaust air.

(d) shows the process which carries out thermocompression bonding of the bag of c.

[Drawing 2] The schematic diagram for explaining the manufacture technique of the electroluminescence LGT of the 2nd example of this invention.

[Drawing 3] The conventional electroluminescence LGT is a notch perspective diagram a part.

[Drawing 4] The schematic diagram of the manufacturing installation of the conventional electroluminescence LGT.

[Drawing 5] The cross-sectional view for explaining the technical probrem of the conventional electroluminescence LGT.

[Description of Notations]

1	Electroluminescence Devices
2	Envelope Film
2a	Closure section
3	Ejection Electrode
4	Foam
5	Bag
5a	Opening
7	Exhaust Pipe
8	Temporary Closure Section
20	Band-like Envelope Film
21, 23	Roll
22	Hot Calender Roll